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ABSTRACT

This document presents an outline for a 135-hour course designed to familiarize the student with the operation, inspection, and repair of aircraft fuel, hydraulic, and pneumatic systems. It is designed to help the trainee master the knowledge and skills necessary to become an aviation airframe mechanic. The aviation airframe maintenance technician must be able to demonstrate his ability to troubleshoot, service, and repair aircraft fuel systems; his ability to troubleshoot, remove, and install aircraft fuel components; his ability to troubleshoot, service, and repair aircraft hydraulic and pneumatic systems; and his ability to troubleshoot, remove, and install aircraft hydraulic and pneumatic system components. The behavioral objectives and performance standards necessary for a person to become an airframe mechanic, or a combined airframe and powerplant mechanic, with a Federal Aviation Agency license are specified. A Quinmester posttest sample is included. (KP)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

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AVIATION MECHANICS 3 (Air Frame)
(Aircraft Fuel, Hydraulic and Pneumatic Systems)

Department 48 - Course 9067.01

CE 001 119

DADE COUNTY PUBLIC SCHOOLS

DIVISION OF INSTRUCTION • 1971

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D A D E C O U N T Y P U B L I C S C H O O L S

1 4 1 0 N O R T H E A S T S E C O N D A V E N U E

M I A M I, F L O R I D A 33132

Course Outline

AVIATION MECHANICS 3 (Air Frame)
(Aircraft Fuel, Hydraulic and Pneumatic Systems)

Department 48 - Course 9067.01

the division of

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Miami, Florida 33132

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Course Description

9067	48	9067.01	Aircraft Fuel, Hydraulic and Pneumatic Systems
State Category	County Dept.	County Course	Course Title

To familiarize the student with the operation, inspection and repair of aircraft fuel, hydraulic and pneumatic systems.

Indicators of success: Successful completion of ALL quinmesters of the Aviation Mechanics (Airframe and Powerplant General) course, Number 9073.

PREFACE

The course outline that follows has been prepared as a guide to help the trainee in the skills and knowledge necessary to become an Aviation Airframe Mechanic.

This is a course composed of knowledge and skills necessary should one decide to follow the Airframe Mechanic or combined Airframe and Powerplant Mechanic Curriculum leading to a Federal Aviation Agency License.

Trainees desiring to follow this curriculum must first successfully complete the basic Aviation Mechanic Curriculum Course which applies equally to both the Airframe and Powerplant License. This course is composed of two blocks of several units each, requiring one quinmester or 135 hours. The several quinmesters of course 9065 must also be successfully completed if the student desires to apply for his license examinations.

Great emphasis will be placed on the use of lecture, audio-visual aids and instruction sheets of various types. A listing of the Behavioral Objectives which are to be met to earn satisfactory grades is included. Following each unit title will be found, in parentheses, several letters and numbers designating the time spent in terms of theory and shop work. EIT designates the estimated instructional

time, T indicates the time spent in theory or classroom work and L/S indicates time spent in laboratory or shop work.

The level 1 following a unit denotes that the student must have knowledge of general principles but no practical application nor manipulative skills. Instruction is given by lecture, demonstration and discussion. The level 2 following a unit denotes that the student must have knowledge of general principles and limited practical application, and adequate manipulative skill to perform basic operations. Instruction is given by lecture, demonstration, discussion and a limited amount of practical application. The level 3 following a unit denotes that the student must have knowledge of general principles and performance of a high degree of practical application and sufficient manipulative skill to accomplish return-to-service operations. Instruction at this level is given by lecture, demonstration, discussion and a large amount of practical application.

This outline has been developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee and the Vocational Teacher Education Service, and has beer approved by the Dade County Vocational Curriculum Committee.

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with Suggested Hourly Breakdown

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GOALS

The aviation airframe maintenance technician must be able to demonstrate:

1. His ability to troubleshoot, service and repair aircraft fuel systems.

2. His ability to troubleshoot, remove and install aircraft fuel system components.

3. His ability to troubleshoot, service and repair aircraft hydraulic and pneumatic systems.

4. His ability to troubleshoot, remove and install aircraft hydraulic, and pneumatic system components.

Course Outline

AVIATION MECHANICS 3 (Air Frame)
(Aircraft Fuel, Hydraulic and Pneumatic Systems)

Department 48 - Course 9067.01

I. AIRCRAFT FUEL SYSTEMS (44 hours)

A. Inspect, Service and Repair Fuel Systems
(Level - 3) (EIT-15 hrs) (T-7.5 hrs) (L/S-7.5 hrs)

1. Fuel Tanks
   a. Construction features
      (1) Baffles
      (2) Sumps
      (3) Strainers
      (4) Filler openings
      (5) Vents
         (a) Requirements for venting a fuel tank
         (b) Effect of a plugged vent
   b. Tank Installation
      (1) Metal tanks
      (2) Flexible bladder tanks
      (3) Integral type tanks
   c. Servicing fuel tanks
      (1) Safety precautions
      (2) Condensation in fuel tanks
2. Fuel Valves and Fuel Pumps
   a. Fuel valves
      (1) Fuel shut-off valves
      (2) Fuel selector valves
      (3) Cross-feed valves
   b. Fuel pumps
      (1) Wobble pumps
      (2) Main fuel pumps
         (a) Engine driven fuel pumps
         (b) Electric fuel pumps
      (3) Fuel booster pumps
         (a) Submerged booster pumps
         (b) Installation precautions
         (c) Use during engine starting
         (d) Use during take-off and landing

I. AIRCRAFT FUEL SYSTEMS (Contd.)

B. Repair Engine Fuel System Components
(Level - 2) (EIT-11 hrs) (T-5.5 hrs) (L/S 5.5 hrs)
1. Repair of Fuel Tanks
   a. Cleaning or purging before repair
   b. Cleaning before reinstallation
2. Fuel System Components
   a. Selector valves
      (1) Detents
      (2) Placards
   b. Fuel lines
      (1) Minimum size
      (2) Routing
      (3) Color coding
   c. Fuel drains
      (1) Position of fuel drain in the system
      (2) Fuel tank sump drain

C. Inspect and Repair Fuel Quantity Indicating System
(Level - 2) (EIT-8 hrs) (T-4 hrs) (L/S-4 hrs)
1. Inspect Fuel Quantity Indicating Systems
   a. Direct reading fuel quantity indicators
   b. Remote reading fuel quantity indicators
2. Repair Fuel Quantity Indicating Systems
   a. Direct reading fuel quantity indicators
   b. Remote reading fuel quantity indicators

D. Inspect, Check and Repair Pressure Fuel Systems
(Level - 1) (EIT-2 hrs) (T-2 hrs) (L/S-0 hrs)
1. Inspect Pressure Fuel Systems
2. Repair Pressure Fuel Systems

E. Check and Service Fuel Dump Systems
(Level - 1) (EIT-2 hrs) (T-2 hrs) (L/S-0 hrs)
1. Describe Checking Operation of a Fuel Dump System
2. Describe Servicing a Fuel Dump System

F. Fuel Management, Transfer and Defueling
(Level - 3) (EIT-3 hrs) (T-1 hr) (L/S-2 hrs)
1. Fuel Transfer Methods
2. Defueling Methods

I. AIRCRAFT FUEL SYSTEMS (Contd.)

G. Fuel Pressure and Temperature Warning Systems
(Level - 2) (EIT-3 hrs) (T-1.5 hrs) (L/S-1.5 hrs)
1. Fuel Pressure Warning Systems
2. Fuel Temperature Warning Systems

II. HYDRAULIC AND PNEUMATIC POWER SYSTEMS (91 hours)

A. Identify and Select Hydraulic Fluids
(Level - 3) (EIT-2 hrs) (T-1 hr) (L/S-1 hr)
1. Identify hydraulic fluid
   a. Vegetable base fluid
   b. Mineral base fluid
   c. Ester base fluid
2. Select Hydraulic Fluid

B. Repair Hydraulic and Pneumatic Power System Components
(Level - 2) (EIT-18 hrs) (T-9 hrs) (L/S-9 hrs)
1. Select and Install Seals
   a. "O" ring seals
   b. Cup seals
   c. Chevron seals
2. Hydraulic Selector Valve
   a. Rotor type selector valve
   b. Poppet type selector valve
   c. Piston type selector valve
3. Remove and Install Hydraulic Pressure Regulators
   a. Remove a pressure regulator
   b. Install a pressure regulator
   c. Test and adjust regulator pressure
4. Operation of a Pneumatic Power System
   a. Multistage compressor
   b. Intercooler
   c. Filter/oil separator

C. Inspect, Check, Service, Troubleshoot and Repair Hydraulic and Pneumatic Power Systems
(Level - 3) (EIT-71 hrs) (T-35.5 hrs) (L/S-35.5 hrs)
1. Force, Area and Pressure
   a. Simple levers
   b. Mechanical advantage
   c. Hydraulic advantage
   d. Incompressibility of liquids
   e. Transmission of force

II. HYDRAULIC AND PNEUMATIC POWER SYSTEMS (Cont'd.)

2. Operation of a Basic Hydraulic System
   a. Hand pumps
   b. Actuating cylinders
   c. Reservoirs
   d. Check valves
   e. Selector valves
   f. Relief valves
   g. Power pumps
   h. Pressure regulator
   i. Accumulator
   j. Hydraulic fuse
   k. Flap overload valve
   l. Orifice check valve
   m. Sequence or timing valve
   n. Shuttle valve
   o. Pressure gauges and snubbers
3. Constant Pressure and Open Center Hydraulic Systems
   a. Constant pressure systems
   b. Open center systems
4. Inspect and Service Hydraulic Reservoirs
   a. Servicing placard
   b. Filler openings
   c. Expansion space
   d. Fluid quantity
   e. Filters
5. Hydraulic Pumps
   a. Constant displacement pumps
   b. Variable displacement pumps
6. Check, Inspect, Remove and Install Hydraulic Pumps
   a. Engine driven pumps
   b. Electrically driven pumps
7. Troubleshooting Hydraulic Pumps
   a. Engine driven pumps
   b. Electrically driven pumps
8. Hydraulic Accumulators
   a. Operation
   b. Servicing
   c. Inspection
   d. Removal
   e. Replacement
   f. Safety precautions

II. HYDRAULIC AND PNEUMATIC POWER SYSTEMS (Contd.)

9. Hydraulic System Pressures
   a. Normal system operation
   b. Low system pressure
   c. High system pressure
   d. Fluctuating pressure
   e. Adjustment of pressures
10. Hydraulically Operated Flap System
   a. System operation
   b. Inspection of flap system
   c. Flap adjustments

III. QUINMESTER POST TEST

BEHAVIORAL OBJECTIVES

BLOCK I - AIRCRAFT FUEL SYSTEMS

A. Inspect, Check, Service, Troubleshoot and Repair Aircraft Fuel Systems.

1. Inspect and Service Fuel Tanks

Given:

Fuel tanks of the separate metal type, flexible bladder and integral types, appropriate service information and copies of the applicable Federal Aviation Regulations.

Performance:

The student will inspect each of the three different types of tank. Using appropriate service information, he will describe the construction characteristics and installation precautions for each type of tank.

Standard:

The inspection will be performed as specified in the service manual. Correct nomenclature and terminology will be applied to all descriptions of servicing and installations.

2. Inspect, Check, Service, Troubleshoot and Repair Fuel Valves and Fuel Pumps.

Given:

An operational fuel system or test bench mock-up, manually operated fuel valves, engine driven fuel pumps, electrically driven fuel pumps, and service information pertaining to the operation and troubleshooting of fuel valves and pumps.

Performance:

The student will inspect, check, service, troubleshoot and repair each type of valve and pump.

Standard:

Each unit will function within the tolerance provided and will be free from leaks and other hazards, but need not meet return-to-service standards.

B. Repair Aircraft Fuel System Components

1. Interpret Information Pertaining to the Repair of Fuel Tanks.

Given:

Typical aircraft fuel tanks of the separate metal type, flexible bladder and integral types, ten written questions pertaining to the repair of fuel system tanks, and appropriate written reference information.

Performance:

The student will locate and interpret information from repair manuals and describe the repair procedures for each type of tank.

Standard:

The repair procedures will be interpreted without error. Correct nomenclature and terminology will be used in all descriptions.

2. Interpret Information Pertaining to the Repair of Fuel System Components

Given:

Aircraft fuel system strainers, selector valves, fuel lines and hoses, and fuel drains, appropriate reference information and ten written questions pertaining to the repair of fuel system components.

Performance:

The student will locate and interpret information from the manuals and describe the repair procedures for fuel system components as specified in the written questions.

Standard:

The repair procedures will be interpreted without error. Correct nomenclature and terminology will be used as a part of all descriptions.

C. Inspect and Repair Fuel Quantity Indicating Systems

1. Inspect Fuel Quantity Indicating Systems

Given:

An operational fuel quantity indicating system of the direct reading (sight gauge or mechanical float) type, and a remote indicating electrical type, appropriate reference information and ten statements describing malfunction of the systems.

Performance:

The student will inspect the operating systems, correctly interpret information from the manuals and describe the repairs that would be undertaken to correct the malfunctions described in the ten statements.

Standard:

The repair practices and procedures of the manual will be interpreted without error. Correct nomenclature will be used as a part of all described repairs.

2. Repair Fuel Quantity Indicating Systems

Given:

An operational fuel quantity indicating system of the direct reading (sight gauge or mechanical float) type, and a remote indicating electrical type, appropriate reference information and ten statements describing malfunctions of the system.

Performance:

The student will inspect the operating systems, correctly interpret information from the manuals and describe the repair that would be undertaken to correct the malfunctions described in the ten statements.

Standard:

The repair practices and procedures of the manual will be interpreted without error. Correct nomenclature will be used as a part of all described repairs.

D. Inspect, Check and Repair Pressure Fueling Systems

1. Describe the Inspection of Pressure Fueling Systems

Given:

Visual aids, mock-ups, and technical data available from the manufacturer's manual.

Performance:

The student will describe the procedures to be followed when inspecting pressure type fueling systems.

Standard:

Reference publications will be used during the descriptions. Correct nomenclature and terminology will be used as a part of all descriptions.

2. Describe the Repair of Pressure Fueling Systems
   Given:
   Visual aids, mock-ups and technical data available from the manufacturer's service manual.
   Performance:
   The student will describe the procedures to be followed when repairing pressure type fueling systems.
   Standard:
   Reference publications will be used during descriptions. Correct nomenclature and terminology will be used as a part of the description.

E. Check and Service Fuel Dump Systems

1. Describe the Checking of a Fuel Dump System
   Given:
   Visual aids and the technical data available from the manufacturer's service publications.
   Performance:
   The student will locate information in the reference publication and describe checking a fuel dump system.
   Standard:
   Correct nomenclature and terminology will be required as a part of the description.

2. Describe the Servicing of a Fuel Dump System
   Given:
   Visual aids and the technical data available from the manufacturer's service publications.
   Performance:
   The student will locate information in the reference publication and describe servicing a fuel dump system.
   Standard:
   Correct nomenclature and terminology will be required as a part of the description.

F. Perform Fuel Management, Transfer and Defueling

1. Perform Fuel Transfer
   Given:
   Schematic diagrams or mock-ups of a fuel system that incorporate provisions for cross-feed, fuel transfer and the service

publications that cover the specific systems.

Performance:

The student will locate information in the appropriate technical publications and describe the procedure necessary to transfer or cross-feed fuel.

Standard:

Correct nomenclature and terminology will be used as a part of the description of operation.

2. Perform Defueling

Given:

Schematic diagrams or mock-ups of a fuel system that incorporates provisions for cross-feed, fuel transfer and the service publications that cover the specific systems.

Performance:

The student will locate information in the appropriate technical publications and describe the procedures necessary to defuel the system.

Standard:

Correct nomenclature and terminology will be used as a part of the description of operation.

G. Troubleshoot, Service and Repair Fuel Pressure and Temperature Warning Systems

1. Fuel Pressure Warning Systems

Given:

An operating fuel system installed in an airplane or a mock-up, including a pressure and temperature system, a schematic diagram of the system, and service information applicable to the specific system.

Performance:

The student will operate the system and adjust the pressure sensing devices. He will interpret information and identify the cause of an instructor-introduced fault in the system. He will repair the system as directed in the service manual.

Standard:

All troubleshooting, servicing and repair of the fuel pressure warning system will be in accordance with the service publication. Repair information in the service manual will be followed without error.

2. Temperature Warning Systems

Given:

An operating fuel system installed in an airplane or on a mock-up, including a pressure and temperature warning system, and service information applicable to the specific system.

Performance:

The student will operate the system and adjust the temperature sensing devices. He will interpret information and identify the cause of an instructor-introduced fault in the system. He will repair the system as described in the service manual.

Standard:

All troubleshooting, servicing and repair of the temperature warning system will be in accordance with the service publications. Repair information in the service manual will be followed without error.

BLOCK II - HYDRAULIC AND PNEUMATIC POWER SYSTEMS

A. Identify and Select Hydraulic Fluids

1. Identify Hydraulic Fluids

Given:

Samples of ester base, petroleum base and vegetable base hydraulic fluids, with written information describing characteristics of the various fluids.

Performance:

The student will distinguish between the samples by color, odor and specification number.

Standard:

The three types of fluid will be identified without error.

2. Select Hydraulic Fluid

Given:

Placards of the type attached to hydraulic reservoirs, written information describing the characteristics and uses of hydraulic fluids.

Performance:

The student will select the correct type of fluid for the system to be serviced.

Standard:

Reference information and placards will be correctly identified and complied with.

B. Repair Hydraulic and Pneumatic Power System Components

1. Select and Install Seals

Given:

Hydraulic components not requiring complex assembly and disassembly, various types and sizes of seals and fluids, and reference information describing the procedures for replacing and testing seals in a hydraulic unit after replacement.

Performance:

The student will use and interpret information that will assist in identifying and selecting seals for use in ester, petroleum and vegetable base hydraulic fluids. He will install seals in one unit in accordance with procedures specified in the manual, and will test the unit following reassembly.

Standard:

The unit which had seals replaced will function as it was designed to operate, without internal or external leakage.

2. Identify, Remove and Install a Hydraulic Selector Valve

Given:

An operational hydraulic system or a segment including a source of hydraulic pressure, a selector valve, an actuating cylinder, written service instructions, spare selector valve to install in the system, line caps and plugs, and a supply of hydraulic fluid.

Performance:

The student will identify, remove and install a selector valve in the system. He will operationally check the system following replacement of the valve.

Standard:

The selector valve will be identified, regardless of type. The removal and installation procedure will be adhered to without error or omission. The system will function normally.

3. Remove and Install Hydraulic Pressure Regulators

Given:

An operational hydraulic system, written reference information, a replacement pressure regulator, line caps and plugs, and hydraulic fluid.

Performance:

The student will identify, remove and install a pressure regulator in the hydraulic system. The pressure will be adjusted to within the tolerance specified in the maintenance instructions.

Standard:

The procedures will be fully in accordance with the written instructions. The pressure will be adjusted to within the tolerance specified in the instructions.

4. Interpret and Describe the Operation of a Pneumatic Power System

Given:

Diagrams and drawings of a pneumatic power system, including a multi-stage compressor, filter, intercooler and/or oil separator, and written reference information describing the operation of the system.

Performance:

The student will interpret information and explain the principles of pneumatics and the operation of the specific system.

Standard:

Explanations and descriptions will be in accordance with the technical information provided. Correct nomenclature and terminology will be a part of all explanations and descriptions.

C. Inspect, Check, Service, Troubleshoot and Repair Hydraulic and Pneumatic Power Systems

1. Solve Problems Involving Force, Area and Pressure

Given:

Ten problems applying the relationship of applied force, area of the cylinder or piston, and pressure per unit area.

Performance:

The student will solve the problems when one of the factors is unknown. He will explain the hydraulic principles involved in the solution of the problems.

Standard:

At least eight of the ten problems will be solved correctly. Correct nomenclature and terminology will be used in all solutions and explanations.

2. Interpret Reference Information Pertaining to the Operation of a Basic Hydraulic System

Given:

Reference manuals, drawings, diagrams, mock-ups or components installed in aircraft hydraulic systems, including but not limited to: reservoir, pumps, check valves, actuating cylinders, selector valves, relief valves, pressure regulators, accumulators, fuse, sequence valve and pressure gauges.

Performance:

The student will interpret the reference information and diagram a basic hydraulic system. He will show and explain the relationship, purpose and function of each component in the system.

Standard:

Reference material will be interpreted without error. Correct nomenclature and terminology will be used in all explanations and descriptions.

3. Compare Constant Pressure and Open Center Types of Hydraulic System

Given:

Charts, manuals, diagrams, mock-ups or complete aircraft hydraulic systems of the constant pressure and open center types.

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A P P E N D I X

Quinmester Post Test Sample

Quinmester Post Test

Name_____ Date_____ Score_____

1. A hydraulic system unit which allows normal fluid flow, but closes when flow becomes excessive is called

    1. an orifice valve.
    2. a time lag valve.
    3. a hydraulic fuse.
    4. a restrictor.

2. On a hydraulic system equipped with porous paper filters, how are the filters cleaned?

    1. They should be washed in naptha and dried thoroughly.
    2. They should be replaced after a specified time in service.
    3. By turning the filter crank two complete turns.
    4. They should be washed vigorously in kerosene or unleaded gasoline, dried and dipped in clean hydraulic fluid.

3. A mechanic has replaced an actuating cylinder in a hydraulic system. Since air in the system can be a problem, how is the trapped air removed?

    1. By pressurizing the cylinder before installation.
    2. By actuating the various hydraulic units through several cycles.
    3. Bleed valves which automatically remove air, are installed in every actuating unit.
    4. When the pressure pump cavitates the air will be released from the system.

4. What restricts oil flow in one direction, but permits normal flow the other way?

    1. A check valve with an orifice.
    2. A check valve.
    3. A solenoid valve.
    4. A flow valve.

5. The electrical solenoid in an aircraft anti-skid system

    1. traps pressure in the brake.
    2. relieves pressure to the brakes.
    3. transfers pressure to the opposite brakes.
    4. shuttles brake booster, allowing less pressure to the brake.

6. A "Bourdon Tube" is generally used in

    1. the hydraulic reservoir for emergency fluid supply to the hand pump.
    2. the operating mechanism of most hydraulic pressure gauges.
    3. spool type pressure regulators, as the pressure sensing device.
    4. air-oil struts to reduce shock loads when taxiing.

7. Bleeding of brakes is the term generally given to the

    1. removal of all fluid in the brake system.
    2. replacement of high pressure air in a de-booster system.
    3. withdrawing of brake fluid from the system, to remove trapped air.
    4. the withdrawing of mineral base fluid and replacement of vegetable base fluid.

8. The engine driven hydraulic pump is made with a shaft that contains a shear section, its purpose is

    1. to permit the pump to slip when normal pressure is exceeded.
    2. to allow for thermal expansion.
    3. so the shaft will break if the pump seizes.
    4. so the pump can be reversed.

9. Shuttle valves installed in large aircraft braking systems allow

    1. if necessary, two independent systems to operate the same actuator.
    2. the safe application of brakes regardless of ground speed due to the compensating action of the valve.
    3. fluid to bypass between the right wheel cylinder and the left wheel cylinder if braking pressures

are different.
4. the compensating port, interconnecting both master cylinders to discharge fluid alternating from one to the other.

10. An aircraft pneumatic system which incorporates an engine driven multi-stage reciprocating compressor, also requires

1. a moisture separator.
2. an oil separator.
3. a surge chamber.
4. a vacuum relief valve.

11. Severe 'kick back' of the emergency hand pump during operation is caused when the

1. inlet port check valve of hand pump sticks open.
2. accumulator air side is still charged and hand pump cannot overcome pressure.
3. outlet port check valve of hand pump sticks open.
4. hydraulic reservoir is low on oil.

12. What type seals should be used with skydrol fluid?

1. Solid black neoprene with no color markings.
2. Only those having blue bands around the seal.
3. Black synthetic rubber identified by an irregular red dot.
4. Butyl rubber.

13. If you filled the reservoir in a constant pressure system while pressure was built up, what would happen?

1. Hydraulic fluid would spew out.
2. The hydraulic reservoir fluid level would be higher than normal after pressure was reduced.
3. The sight gauge would still indicate the proper level after the pressure was reduced.
4. This would not assure a reserve oil supply to operate the hand pump.

14. A de-booster is used to

1. relieve pressure in the system.
2. prevent a rapid flow in reverse.

3. reduce pressure to the brakes.
4. is not used.

15. The most common hydraulic selector valve is the

1. four way valve.
2. selective valve.
3. three way valve.
4. two way valve.

16. The type fluid to be used in an aircraft hydraulic system can be determined by

1. a chemical analysis of a sample of fluid from the system.
2. the markings on or near the reservoir filler opening.
3. the color code attached to the hydraulic lines.
4. mixing a sample of fluid to be added with a sample of fluid in the system and observing the reaction.

17. Hydraulic systems usually require several different pressure settings on many of the units in the system. The general rule to follow when setting these valves is to

1. adjust the units with the highest pressure settings first.
2. always adjust units in the landing gear system first, then the auxiliary systems.
3. start with the unit with the lowest setting and then move upward.
4. start with unit that is most distant from pressure pump then work toward the pump.

18. How would you bleed a system pressure if you wished to remove the pressure relief valve?

1. Tighten the tension on the overload valve.
2. Loosen the tension on the overload valve.
3. Operate the flaps.
4. Relieve the pressure by bleeding the brakes.

19. The purpose of the outlet standpipe in the hydraulic reservoir is

    1. for the emergency system at any time.
    2. for the emergency hand pump use when the normal system fluid has been exhausted.
    3. not related to the emergency system.
    4. to reduce air accumulation in the reservoir.

20. An orifice valve will prevent flaps from retracting too fast. It is installed in the

    1. flap 'down' line between the selector valve and the flap actuating cylinder.
    2. flap 'up' line between the actuating cylinder and selector valve.
    3. return line from the selector valve to the reservoir.
    4. return line to the accumulator.

21. How can you determine the amount of precharge on an accumulator?

    1. Read off main gauge.
    2. Actuate some unit and look for a rapid pressure drop.
    3. Apply pressure to the system using a hand pump and when the pressure starts to build, this is the accumulator precharge pressure.
    4. Use hand pump and pressurize the system, then read the accumulator.

22. If the main hydraulic line breaks,

    1. the landing gear can be retracted.
    2. the landing gear can be lowered.
    3. the landing gear cannot be lowered.
    4. the landing gear can be lowered; however, it will not lock in the down position.

23. A timing valve in a hydraulic system may also be known as a

    1. check valve.
    2. reverse-flow valve.
    3. sequence valve.
    4. supplementary valve.

24. There are three basic types of hydraulic pressure pumps, they are

    1. gear, gerotor and vane.
    2. gear, piston and gerotor.
    3. piston, vane and gerotor.
    4. gerotor, piston and vacuum.

25. When using Skydrol fluid in the hydraulic system

    1. natural rubber seals should be used.
    2. synthetic (neoprene) rubber seals should be used.
    3. either natural rubber or synthetic seals are compatible with Skydrol.
    4. seals of a pressed fibre type should be used because of the deteriorating effect of Skydrol on either natural or synthetic rubber seals.

26. The location of the brake de-booster is

    1. between the power brake control valve and the brakes.
    2. in the hydraulic system just ahead of the power brake control valve.
    3. between the relief valve and the power brake control valve.
    4. within the brake control unit since it is an integral part of the brakes and brake shoes.

27. What is used to separate the air and oil in a hydraulic accumulator?

    1. A centrifugal separator.
    2. A flexible separator.
    3. A metallic diaphragm.
    4. Air on top and oil on the bottom.

28. Instrument static system leakage can be detected by observing the rate of change in indication of the

    1. altimeter after pressure has been applied to the static system to cause a prescribed equivalent altitude to be indicated.
    2. airspeed indicator after pressure has been applied to the static system to cause a prescribed equivalent airspeed to be indicated.

3. altimeter after suction has been applied to the static system to cause a prescribed equivalent altitude to be indicated.

4. airspeed indicator after suction has been applied to the static system to cause a prescribed equivalent airspeed to be indicated.

29. On a single line pneumatic system, the used air is

1. dumped overboard.
2. stored in low pressure bottles.
3. stored in high pressure bottles.
4. returned to the compressor.

30. The hydraulic system unloading valve

1. operates when the system is up to normal pressure.
2. acts as a means of hydraulic system relief.
3. operates at a time in which the hydraulic pumps are inoperative.
4. all of the above are correct.

KEY TO QUINMESTER POST TEST
9067.01

1.	3	11.	3	21.	3
2.	2	12.	4	22.	2
3.	2	13.	2	23.	3
4.	1	14.	3	24.	2
5.	2	15.	1	25.	2
6.	2	16.	2	26.	1
7.	3	17.	1	27.	2
8.	3	18.	3	28.	3
9.	1	19.	2	29.	1
10.	1	20.	1	30.	4